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PLANNING AND EXECUTING A UNIFORM POLLUTION ABATEMENT PROGRAM FOR THE KANSAS RIVER BASIN

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PLANNING AND EXECUTING A UNIFORM POLLUTION ABATEMENT PROGRAM FOR THE KANSAS RIVER BASIN

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SYNOPSIS

A comprehensive plan for the abatement of municipal and industrial pollution in the Kansas River Basin is described. Emphasis is placed upon the development and administration of the program. The methods used in developing an acceptable pollution abatement policy through public hearings are outlined. Plans for obtaining support for specific bond issues are also recounted. The policy is uniform in that it applies to all polluters, but it is flexible to adjust to special conditions and downstream water uses.

Twenty-three new sewage treatment plants have been built since the policy was adopted 3-1/2 years ago, and 27 other cities which lack sewage treatment are in various stages of planning.

The Kansas River Basin is fast becoming one of the best known major river basins in the country. The billion dollar flood in 1951 and well-publicized differences of opinion among residents of the Basin on the best methods to control floods have drawn increasing national attention to the water resource problems of this river valley.

The program being carried out to eliminate pollution throughout the 35,000 square mile portion of the Kansas River Basin in Kansas has also attracted some attention, since it was a large scale, basin-wide attempt, and because it was inaugurated at a time when persons throughout the country were increasingly concerned with stream pollution as a national problem.

The Kansas River Basin covers 60,000 square miles in Colorado, Nebraska and Kansas. In Kansas it encompasses roughly the northern half of the state with a length of 400 miles and an average width of 90 miles. The ground surface is relatively porous in the western end of the basin in Kansas, and the average annual rainfall of 20 inches per year or less causes intermittent flow in the streams. The eastern part of the basin is underlain by shales and limestones, and has an average annual rainfall approaching 37 inches. This part of the basin is an area of more intense flooding and of continuous flow in the streams. The Kansas River is some 170 miles long and is formed by the Smoky Hill and Republican Rivers at Junction City, 110 airline miles west of Kansas City.

Towns are scattered throughout the basin, with the greatest concentration of population in the eastern one-fourth. Seventy-nine cities have sewer systems which serve 385,000 persons. Additional organic wastes from industrial sources contribute a population equivalent in excess of 825,000 to give a total sewered population equivalent of more than 1,210,000. Even then, the largest industrial waste problem is not concerned with organic pollution. It is caused by the oil field brines produced over large areas of the Basin.

1. Chief Engineer, Kansas State Board of Health, Lawrence, Kansas.

The Corps of Army Engineers and the U. S. Bureau of Reclamation, through the Missouri River Basin InterAgency Committee, presented a plan at the end of World War II for the development and utilization of water resources in the Missouri River Basin. The cooperative program proposed by these agencies was known as the Pick-Sloan Plan. Since this program affected the planning for water to be used for sanitation purposes, it was decided by the states of Kansas and Nebraska to undertake a joint study with the interested federal agencies. These included the Corps of Engineers and the Bureau of Reclamation with major assistance from the U. S. Public Health Service.

The purpose of the study was to obtain information on existing water quality and determine the types, sources and amounts of pollution occurring in the basin. It was also proposed to determine the minimum stream flows essential to maintain public water supply and sanitation programs, and to predict, if possible, the effect which construction of several proposed reservoirs might have upon water supplies dependent upon the rivers in the basin.

The investigation included field studies covering all public water supplies and sources of pollution. A program of regular sampling at 353 stations was initiated with chemical, physical and bacteriological determinations being carried out in 3 centrally-located laboratories. Hydrometric measurements were made at the time of sampling to permit quantative evaluation of the laboratory results. The field studies and laboratory investigations extended from December, 1947 through December, 1948.

The study revealed important chemical and bacterial pollution, but the organic pollution was important only in limited stream reaches. The bacterial pollution was particularly important from a public health viewpoint since 5 public water supplies depend upon the Kansas River or its tributaries. Chlorides from oil field brines and from natural salt deposits were shown to contribute important chemical pollution. The high chloride waters coming from streams traversing salt deposits posed a special problem of operation of any system of reservoirs planned for the Basin, as these must function so as to keep the chlorides at the public water supply intakes at satisfactory levels.

Hearings

A six-month period was used in assembling the survey data and publishing it. Copies of the report[1] were mailed to interested persons and to libraries in January, 1950, along with the announcement of four public hearings to be held in March. Special effort was made to obtain news coverage prior to the hearings in both the press and radio. Individual letters were written to all officials, and the Board's engineers gave as many personal invitations as possible during their travels in the area to encourage all interested persons to attend.

The findings of the survey were presented at each hearing, city by city, and industry by industry. Persons attending were encouraged to ask questions and offer comments which were noted by members of the appointed Board of Health who were present. At the conclusion of the hearings a summary was prepared for the Board outlining the public comments.

Most of the persons who attended the hearings were city officials or industry representatives and they participated fully. It was somewhat surprising that these persons who would pay the bill were almost uniformly of the opinion that the Board should more rigidly enforce the existing statutes, and eliminate existing pollution.

1. Kansas River Basin Water Pollution Investigation, U. S. Public Health Service, June 1949.

Board Establishes Policy

Following the hearings, the engineering staff summarized the findings, and prepared a policy for pollution abatement which the Board adopted. It proposed a program, based upon technical and human factors, especially tailored to the needs and resources of the Kansas River Basin. The proposal provided that all cities or industries without adequate waste treatment facilities should provide them. It further set up time limits for the submission of plans and for the letting of contracts. The larger cities and industries lacking treatment were expected to act first. The second group included those smaller polluters lacking any kind of waste treatment. They were given one additional year to award a contract. The third group included those cities and industries having inadequate treatment. The reasoning for this type of schedule was that the largest sources of pollution should be corrected first, and that those who had not previously provided treatment should take steps to build a plant before those who had already built plants were asked to enlarge them.

The Board recognized in establishing its policy that water uses might dictate an entirely different degree of treatment at one point than at another. Its observations that cities many miles upstream were contributing to the high coliform index at public water supply intakes caused it to decide upon primary treatment, with chlorination where necessary, as the minimum which would protect those supplies.

An important aspect of this program is that the people in the basin had an opportunity, through the public hearings, to participate in its formation. Equally important is its uniform nature. Cities at the extreme lower end of the basin discharging wastes which have to flow only a few hundred yards before they leave the state must take action the same as cities 400 miles upstream.

Another key to this program is the Board's confidence in Kansas citizens to assume their responsibilities. The policy permits time for voluntary action. As this time elapses the Board is dealing on an individual basis with polluters who have not complied. Permits can be revoked, although this has not been necessary so far, making a city or industry which discharges wastes without a permit subject to a daily penalty until the condition is corrected.

Gaining Support for Sewage Treatment

To obtain the public support necessary for the approval of bond issues for sewage treatment, the Board has devoted considerable attention to developing methods for acquainting voters with the stream pollution problem. That the Board's approach to pollution abatement has been one of voluntary cooperation with education rather than the regulatory approach is shown by noting that no Kansas city has been taken through the courts since the initial law was passed in 1907. Occasional challenges of the law by industry have not been successful, and contemplated challenges by cities have not materialized.

Local officials are responsible for informing citizens of each community's sewage treatment needs. To assist the local community in providing its own leadership, the Board's engineering staff has prepared a 20-page guide for chairmen of program committees and local officials in preparing public addresses and radio programs. This guide is filled with suggestions used by cities in successful programs for acquainting the public with the facts. It includes specific information tailored to each community, including a fact sheet showing technical and financial data.

In addition to supplying facts and data to local citizens, the Board of Health has supplied speakers upon request. Meetings planned around a 20-minute

talk, or less, with ample time for questions afterward have been the most successful. The speakers have tried to remember that their purpose is to motivate as well as to inform. Each group has been encouraged to start plans for its support of the proposal before the meeting adjourns. This may include the formation of committees, planning for a speaker's bureau, arranging for publicity in the radio and press and such other activities as the group is willing to sponsor.

Experience has shown the necessity for having all of the facts at hand. In some cases this has included facts which from an engineering standpoint are not necessary. If the public wants them, however, they are necessary to the success of the project.

Citizens in two cities questioned the validity of the data contained in the Kansas River Basin Report on the basis that it was limited in scope and covered only one year. They contended further that most of the bacterial pollution was from farm animals, and questioned the need for any program based upon bacteriological measurements.

To answer these questions studies were made of quantities of sewage discharged by the communities in the period 1922-24 and again in 1947-52. The records revealed that for some cities the quantity of sewage, and the connected population, was up to 7 times as great in the later period, and the average increase was more than three-fold.

Studies were then made of the coliform concentrations of the raw water at 4 public waterworks intakes for the two periods. The average concentration had again increased more than three times, with maximum concentration increases also of that order. These increases are believed to be due entirely to human fecal pollution from municipal sewage, since the livestock population for corresponding periods decreased more than one million head.

To carry the facts effectively to the voters, many different media and techniques have been used. The workshop technique is especially successful for the group which will devote an hour or more to considering the pollution problem. The short introductory talk by a Board of Health engineer, division into small discussion groups, a final assembly where further questions are asked the speaker and the drawing of final conclusions particularly appeals to womens' clubs and chambers of commerce.

Portable exhibits have been used to good advantage. Those at both of the state fairs attracted an unusual amount of attention. Local communities have used the large colored poster prepared by the USPHS as background, with the Kansas water pollution laws, the "Clean Streams for Kansas" booklet, the "Mark Trail" comic booklet, local pictures and maps in the foreground.

Surveys of sanitary conditions by the Boy Scouts, presenting survey results to discussion groups, the distribution of educational booklets in the schools and to each home, showing movies at the schools and to civic groups, including a short film on water pollution at the commercial theatres, news stories and editorials, advertisements sponsored by local groups and radio programs have all been used successfully. Each community's interests and needs are different, and whatever the methods used, they will be successful if a few interested, energetic persons in each community work at using them.

The program for the Kansas River Basin has speeded up the building of sewage treatment plants in all parts of the state. Since 1947, 110 of the 270 Kansas cities which have sewer systems have completed new sewage treatment plants. Most of the remaining cities have treatment plants and the majority of them are adequate. The interest of Kansas citizens in sewage treatment and the effectiveness of their educational programs is shown by the fact

that during the time the first 100 plants were built only two cities defeated bond issues for sewage treatment. Both of these approved the expenditure at subsequent elections.

Since adoption of the policy, 23 municipal plants have been placed under contract and completed. Four larger cities are in the advanced stages of planning and will let contracts shortly. Excepting Kansas City, these projects will provide satisfactory treatment for the larger polluters. Twenty-three smaller cities remain without treatment. Most of these have completed engineering reports. Most industries with separate sewers are arranging with cities to treat their wastes.

CONCLUSION

Procedures for determining the degree of stream pollution are well established. However, much remains to be learned about translating technical data concerning pollution into terms which will cause the taxpayer or industrialist to loosen the purse strings. Attempts to do this in the Kansas River Basin have been reasonably successful. On the basis of this experience, full use should be made of community interest and participation in planning the pollution abatement program. The uniformity of the program, in that every polluter was expected to take some action, has increased its effectiveness and its public appeal. It has received good support because it is based on facts which were presented at public meetings, in newspapers, over the radio, at exhibits, through movies and with informational pamphlets. Through these media, Kansans have been convinced of the need for cleaning up their streams.

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